What is claimed is:

1. A crosslinked polymer system comprised of:

at least one monomer having at least one double bond; and

at least one crosslinker having a plurality of functional groups, wherein the functional groups have a greater reactivity than the monomer.

2. The crosslinked polymer system according to claim 1 wherein reactivity ratio (r) of the at least one crosslinker to the at least one monomer for r_1 is in the range of about 0.001 to about 0.8 and for r_2 is in the range of about 1 to about 6.

3. The crosslinked polymer system according to claim 2 wherein the reactivity ratio (r) of the at least one crosslinker to the at least one monomer for r_1 is the range of about 0.05 to about 0.1 and for r_2 is in the range of about 1.3 to about 4.

4. The crosslinked polymer system according to claim 1 wherein %T of the polymer system is in the range of about 5%T to about 40%T and wherein %C is in the range of about 3%C to about 15%C.

5. The crosslinked polymer system according to claim 1 wherein the polymer system is a hydrogel.

6. The crosslinked polymer system according to claim 5 wherein the hydrogel has a hetero microphase structure gel network characterized by a plurality of highly crosslinked loci interconnected by relatively linear polymer chains.

7. The crosslinked polymer system according to claim 6 wherein the functional groups of the at least one crosslinker are all the same and wherein at least two of the functional groups are more reactive than the at least one double bond of the monomer.

8. The crosslinked polymer system according to claim 6 wherein at least two of the functional groups of the at least one crosslinker are different and wherein at least two of the functional groups are more reactive than the at least one double bond of the monomer.

9. The crosslinked polymer system according to claim 1 wherein the at least one crosslinker is selected from the group consisting of linear compounds, branched compounds, and cyclic compounds.

10. The crosslinked polymer system according to claim 1 wherein substantially all the functional groups of the at least one crosslinker have an ethylenic double bond.

11. The crosslinked polymer system according to claim 1wherein the at least one monomer has the formula $H_2C=CR_5\text{-}CO\text{-}N(R_3)R_4$ where R_3 and R_4 are each selected from the group consisting of H, alkyl, alcohol ($\text{-}(CH_2)_n\text{-}OH$), and ester ($\text{-}(CH_2)_n\text{-}OCH_3$), where n is an integer from 1 to 6, and where R_5 is selected from the group consisting of H and substituted alkyl.

12. The crosslinked polymer system according to claim 11 wherein the at least one monomer is selected from the group consisting of acrylamide, acrylamide derivatives, acrylamide substitutes, and mixtures thereof.

13. The crosslinked polymer system according to claim 12 wherein the at least one monomer is selected from the group consisting of N,N-dimethylacrylamide, methacrylamide, N-methyloylacrylamide, propylacrylamide, dipropyl acrylamide, isopropyl acrylamide, diisopropyl acrylamide, lactyl acrylamide, methoxyacrylamide, and mixtures thereof.

14. The crosslinked polymer system according to claim 13 comprised of a monomer system of acrylamide with methylenebismethylacrylamide.

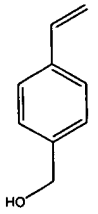
15. The crosslinked polymer system according to claim 13 comprised of a monomer system of acrylamide with 2-hydroxyethyl methacrylate.

16. The crosslinked polymer system according to claim 1 comprised of non-acrylamide type monomers comprising ester type systems.

17. The crosslinked polymer system according to claim 16 wherein the ester type system is comprised of hydroxyethyl acrylate which functions as the at least one monomer and ethyleneglycol dimethacrylate which functions as the at least one crosslinker.

18. The crosslinked polymer system according to claim 16 wherein the ester type system is selected from the group consisting of:

a)



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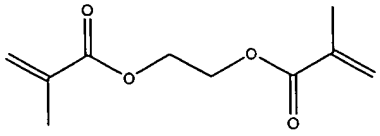

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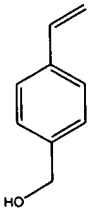

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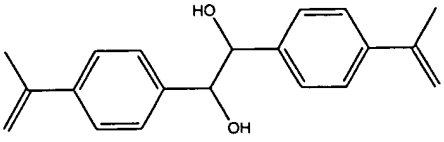

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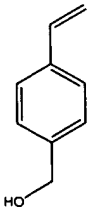

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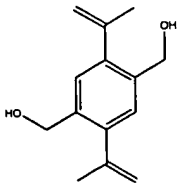

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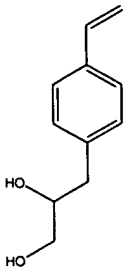

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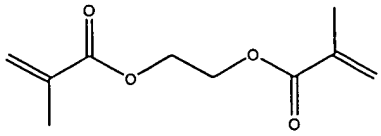

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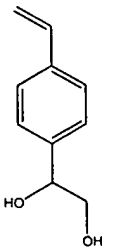

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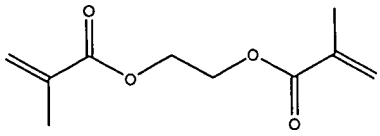

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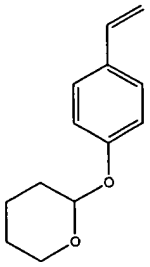

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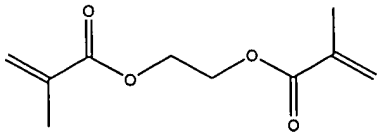

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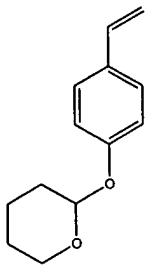

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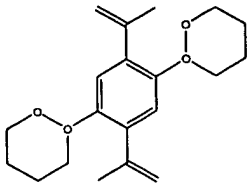


19. The crosslinked polymer system according to claim 1 wherein such system has high optical clarity.

20. An article comprised of a crosslinked polymer system, the crosslinked polymer system comprising at least one monomer having at least one double bond and at least one crosslinker having a plurality of functional groups, wherein the functional groups have a greater reactivity than the monomer.

21. The article according to claim 20 wherein the article is an optical lens.

22. The article according to claim 21 wherein the article is a contact lens.

23. The article according to claim 20 wherein the article is an electrophoresis gel.

24. The article according to claim 23 wherein the electrophoresis gel has a select one of porosity gradient, a composition gradient, and a concentration gradient.

25. The article according to claim 24 wherein the gradient of the electrophoresis gel is achieved by a select one of using different concentrations of the polymer gel and altering the ratio of crosslinker to monomer.

26. The article according to claim 20 wherein the article comprises a membrane formed on a porous substrate.

27. The article according to claim 26 wherein the porous substrate is selected from the group consisting of paper, fabric, woven sheet, and non-woven sheet.

28. A method for forming a crosslinked polymer system comprising the steps of:

preparing a crosslinker solution comprised of at least one crosslinker;

preparing a monomer solution comprised of at least one monomer; wherein the at least one crosslinker in the crosslinker solution must have a greater reactivity then the at least one monomer in the monomer solution;

mixing the crosslinker solution and the monomer solution together to form a crosslinker/monomer solution;

preparing an initiator solution comprised of a polymerization initiating material which initiates polymerization of the crosslinker/monomer solution;

mixing the crosslinker/monomer solution and the initiator solution together to form an initiated solution; and

allowing the initiated solution is allowed to polymerize to form the crosslinked polymer system.

29. The method according to claim 28 wherein reactivity ratio (r) of the at least one crosslinker to the at least one monomer for r_1 is in the range of about 0.001 to about 0.8 and for r_2 is in the range of about 1 to about 6.

30. The method according to claim 29 wherein the reactivity ratio (r) of the at least one crosslinker to the at least one monomer for r_1 is the range of about 0.05 to about 0.1 and for r_2 is in the range of about 1.3 to about 4.

31. The method according to claim 28 wherein %T of the polymer system is in the range of about 5%T to about 40%T and wherein %C is in the range of about 3%C to about 15%C.

32. The method according to claim 28 wherein the polymer system is a hydrogel.

33. The method according to claim 32 wherein the hydrogel has a hetero microphase structure gel network characterized by a plurality of highly crosslinked loci interconnected by relatively linear polymer chains.

34. The method according to claim 33 wherein the functional groups of the at least one crosslinker are all the same and wherein at least two of the functional groups are more reactive than the at least one double bond of the monomer.

35. The method according to claim 33 wherein at least two of the functional groups of the at least one crosslinker are different and wherein at least two of the functional groups are more reactive than the at least one double bond of the monomer.

36. The method according to claim 28 wherein the at least one crosslinker is selected from the group consisting of linear compounds, branched compounds, and cyclic compounds.

37. The method according to claim 28 wherein substantially all the functional groups of the at least one crosslinker have an ethylenic double bond.

38. The method according to claim 28 wherein the at least one monomer has the formula $H_2C=CR_5\text{-}CO\text{-}N(R_3)R_4$ where R_3 and R_4 are each selected from the group consisting of H, alkyl, alcohol ($\text{-}(CH_2)_n\text{-}OH$), and ester ($\text{-}(CH_2)_n\text{-}OCH_3$), where n is an integer from 1 to 6, and where R_5 is selected from the group consisting of H and substituted alkyl.

39. The method according to claim 38 wherein the at least one monomer is selected from the group consisting of acrylamide, acrylamide derivatives, acrylamide substitutes, and mixtures thereof.

40. The method according to claim 39 wherein the at least one monomer is selected from the group consisting of N,N-dimethylacrylamide, methacrylamide, N-methyloylacrylamide, propylacrylamide, dipropyl acrylamide, isopropyl acrylamide, diisopropyl acrylamide, lactyl acrylamide, methoxyacrylamide, and mixtures thereof.

41. The method according to claim 40 comprised of a monomer system of acrylamide with methylenebismethylacrylamide.

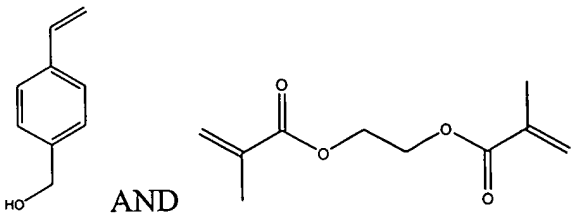
42. The method according to claim 40 comprised of a monomer system of acrylamide with 2-hydroxyethyl methacrylate.

43. The method according to claim 28 comprised of non-acrylamide type monomers comprising ester type systems.

44. The method according to claim 43 wherein the ester type system is comprised of hydroxyethyl acrylate which functions as the at least one monomer and ethyleneglycol dimethacrylate which functions as the at least one crosslinker.

45. The method according to claim 43 wherein the ester type system is selected from the group consisting of:

a)



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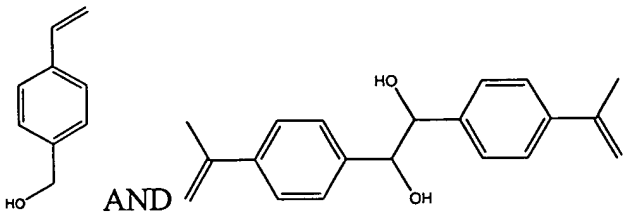

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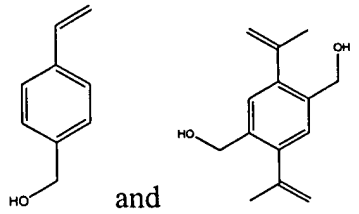

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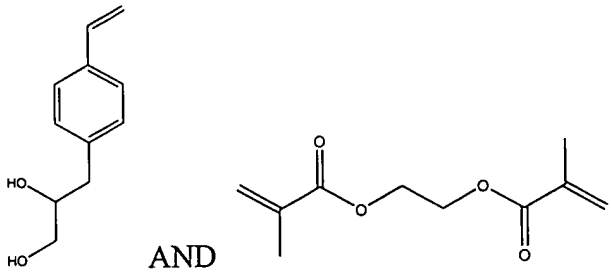

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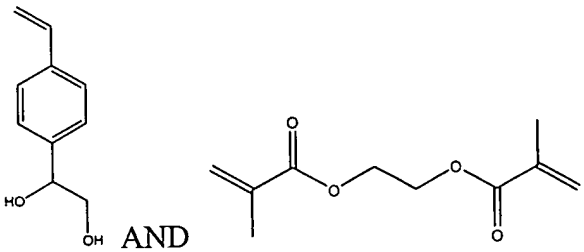

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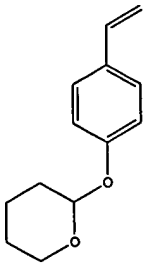

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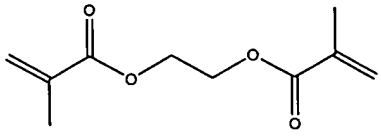

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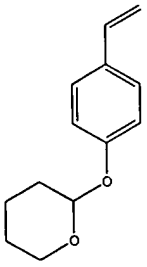

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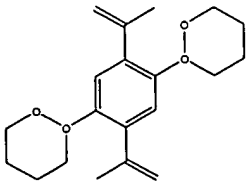

46. The method according to claim 28 wherein such system has high optical clarity.